

FCC PART 15.247

TEST REPORT

For

Kyocera Corporation

2-1-1 Kagahara, Tsuzuki-ku, Yokohama-shi, Kanagawa, Japan, 224-8502

FCC ID: JOYCB64

Report Type: Original Report	Product Name: GSM/WCDMA/LTE Mobile Telephone
Report Number: RDG190709011-00A	
Report Date: 2019-07-29	
Reviewed By:	Jerry Zhang EMC Manager
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		GSM/WCDMA/LTE Mobile Telephone
EUT Model:		CB64
Operation Frequency:		2402-2480MHz
Modulation Type:		GFSK, $\pi/4$ -DQPSK, 8-DPSK
Rated Input Voltage:		DC 3.85V from battery or DC 5V from adapter
Hardware Version:		CB64
Software Version:		msm8937_64-userdebug 9
Adapter Information	Model:	KYCAV1
	Input:	AC 100-240V 50/60 0.3A
	Output:	DC 5.0V 1.2A
External Dimension:		156mm(L)*76mm(W)*9mm(H)
Serial Number:		190709011
IMEI Number:		356283100010182
EUT Received Date:		2019-07-11

Objective

This report is prepared on behalf of **Kyocera Corporation** in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communications Commission's rules

The tests were performed in order to determine the Bluetooth BDR and EDR mode of EUT compliance with radiation spurious emission of FCC Rules Part 15, Subpart C section 15.247 and 15.209 rules.

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices".

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB, 200M~1GHz: 5.92 dB, 1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB, 18G~26.5G: 5.47 dB, 26.5G~40G: 5.63 dB
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 0.4\%$
Duty Cycle	1%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier : CN0022.

FINAL

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.205, §15.209, §15.247(d)	Radiation Spurious Emissions	Compliance

FINAL

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode.

EUT Exercise Software

The software: 'QRCT' was used during test, which was provided by manufacturer. The maximum power level was configured by the software as below table:

Test Software Version	QRCT		
Test Frequency	2402MHz	2441MHz	2480MHz
GFSK	8	8	8
$\pi/4$ -DQPSK	8	8	8
8-DPSK	8	8	8

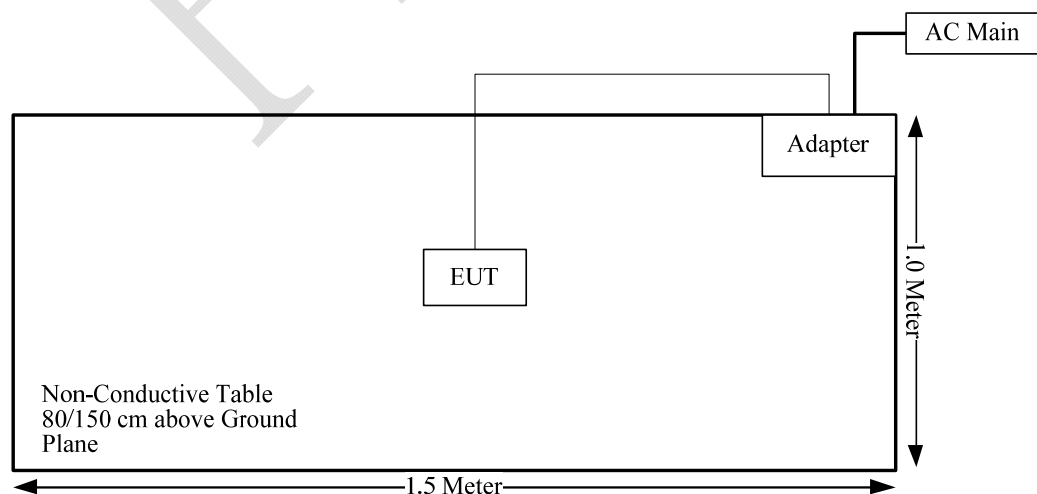
Equipment Modifications

No modification was made to the EUT.

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	Yes	No	1.2	Adapter	EUT

Block Diagram of Test Setup



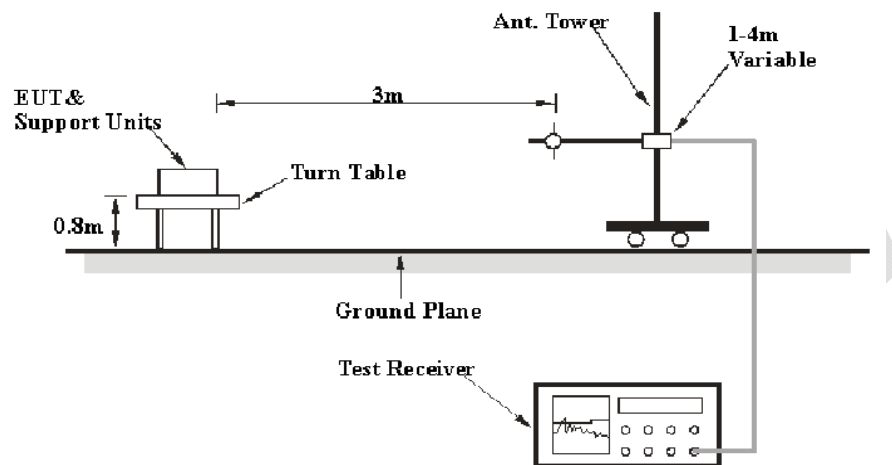
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

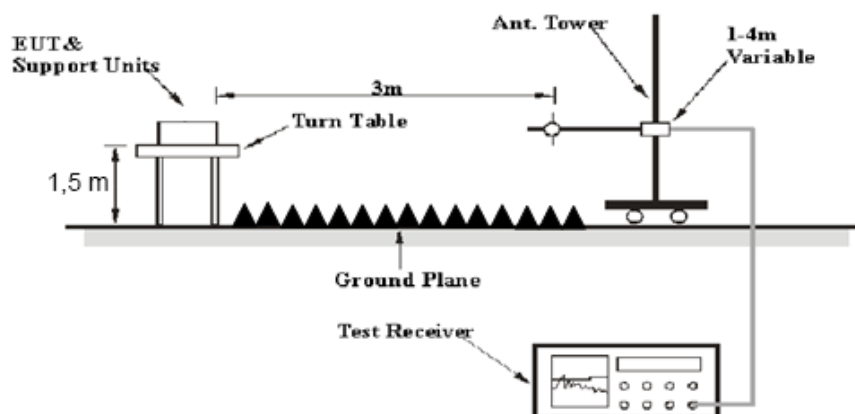
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission below 1GHz tests were performed in the 3 meters chamber A, above 1GHz tests were performed in the 3 meters chamber B, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

According to FCC public notice: DA-00-705, during the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	AV

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, peak and average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

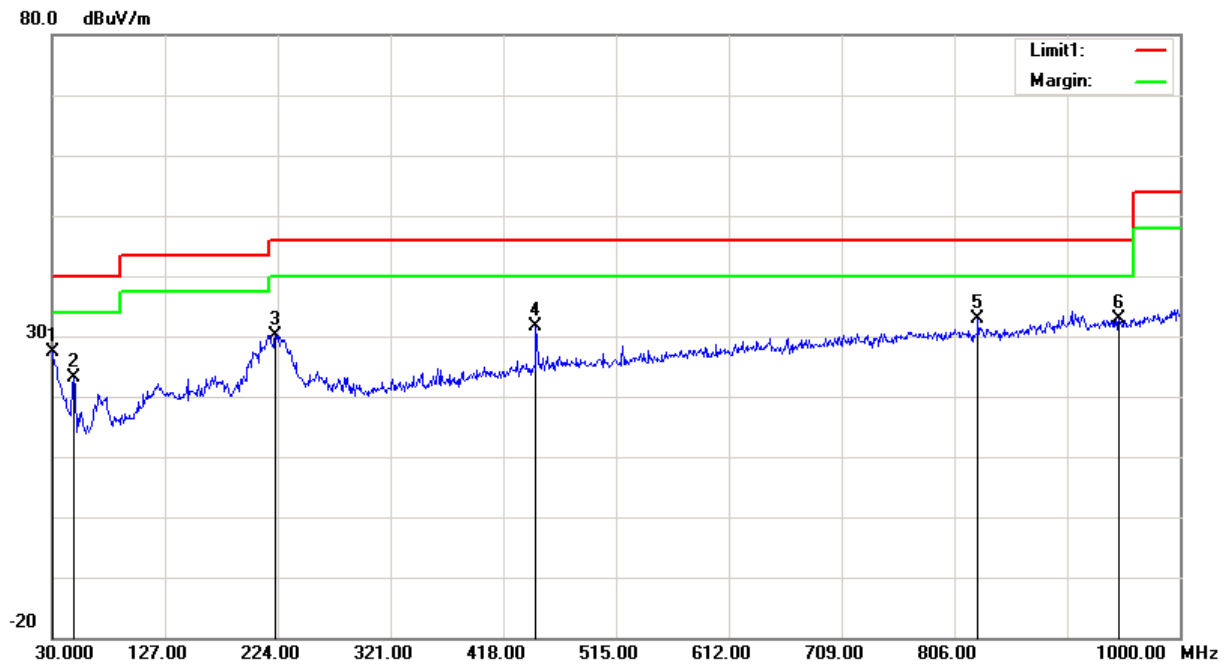
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated emissions below 1GHz					
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-05-06	2020-05-06
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Radiated emissions above 1GHz					
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2019-06-27	2020-06-27
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2019-06-27	2020-06-27
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2019-06-16	2020-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2019-06-16	2020-06-16
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

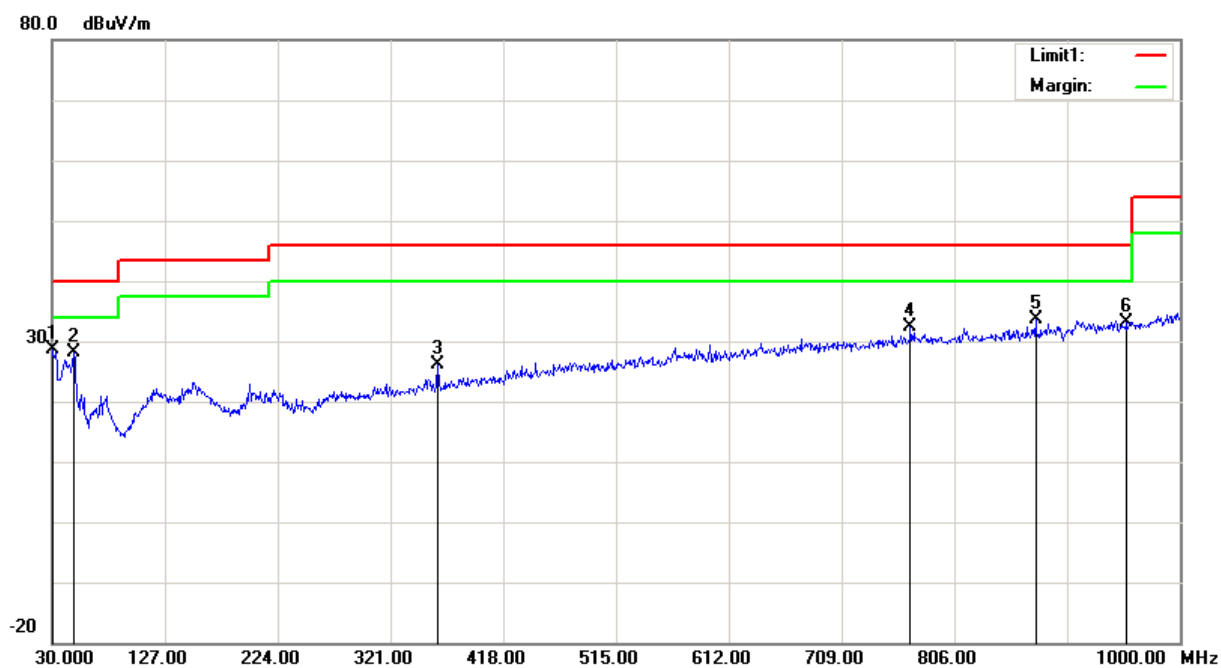
Test Data**Environmental Conditions**

Test Items:	Radiated emissions below 1GHz	Radiated emissions above 1GHz
Temperature:	27.2°C	27.6°C
Relative Humidity:	50%	52%
ATM Pressure:	100.1kPa	100.2kPa
Test by:	Tyler Pan	Lucy Lu
Test Date:	2019-07-24	2019-07-25

Test Mode: Transmitting

1) 30MHz-1GHz (BDR Middle channel was the worst)**Horizontal:**

Frequency (MHz)	Receiver Reading (dBμV)	Remark	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	25.66	peak	1.72	27.38	40.00	12.62
48.4300	33.81	peak	-10.74	23.07	40.00	16.93
222.0600	37.05	peak	-6.86	30.19	46.00	15.81
446.1300	32.87	peak	-1.14	31.73	46.00	14.27
826.3700	27.81	peak	5.05	32.86	46.00	13.14
947.6200	32.16	peak	0.83	32.99	46.00	13.01

Vertical:

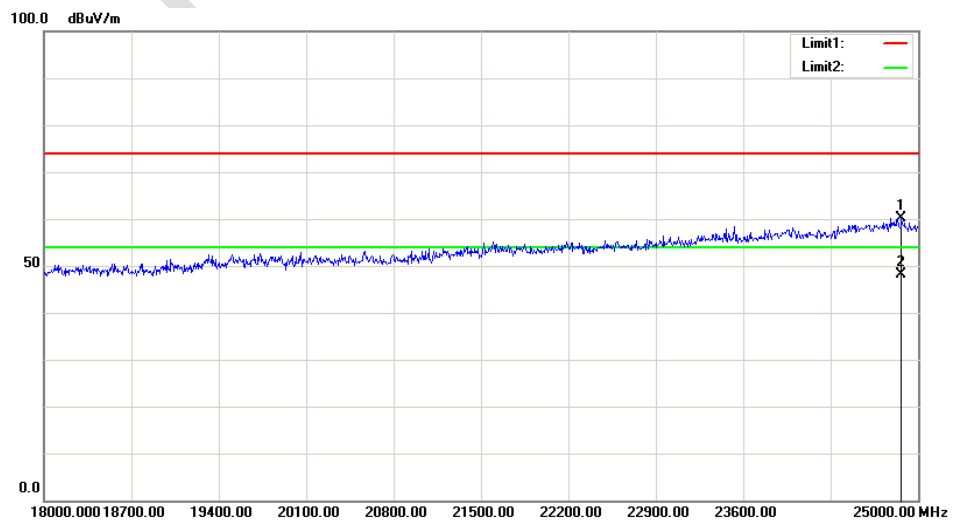
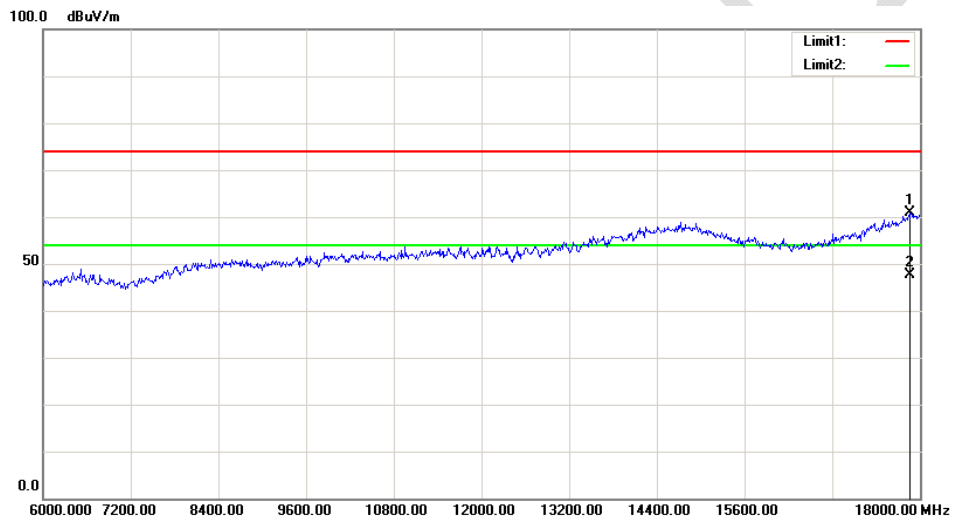
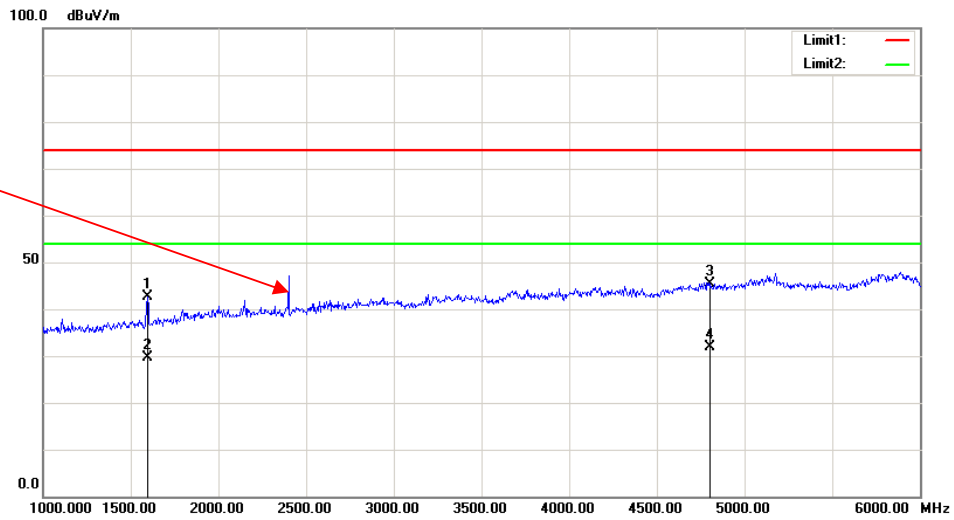
Frequency (MHz)	Receiver Reading (dB μ V)	Remark	Correction Factor (dB/m)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
30.0000	26.93	peak	1.72	28.65	40.00	11.35
48.4300	38.86	peak	-10.74	28.12	40.00	11.88
361.7400	28.82	peak	-2.80	26.02	46.00	19.98
768.1700	28.05	peak	4.26	32.31	46.00	13.69
875.8400	34.20	peak	-0.60	33.60	46.00	12.40
954.4100	32.33	peak	0.82	33.15	46.00	12.85

2)1GHz-25GHz:*BDR Mode (BDR was the worst)*

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
low channel 2402 MHz									
2402.00	63.81	PK	H	28.10	1.80	0.00	93.71	N/A	N/A
2402.00	52.64	AV	H	28.10	1.80	0.00	82.54	N/A	N/A
2402.00	65.15	PK	V	28.10	1.80	0.00	95.05	N/A	N/A
2402.00	54.45	AV	V	28.10	1.80	0.00	84.35	N/A	N/A
2390.00	26.54	PK	V	28.08	1.80	0.00	56.42	74.00	17.58
2390.00	13.36	AV	V	28.08	1.80	0.00	43.24	54.00	10.76
4804.00	47.43	PK	V	32.91	3.17	37.20	46.31	74.00	27.69
4804.00	34.47	AV	V	32.91	3.17	37.20	33.35	54.00	20.65
7206.00	45.87	PK	V	35.74	4.82	37.23	49.20	74.00	24.80
7206.00	32.97	AV	V	35.74	4.82	37.23	36.30	54.00	17.70
Middle Channel: 2441 MHz									
2441.00	63.62	PK	H	28.18	1.82	0.00	93.62	N/A	N/A
2441.00	52.51	AV	H	28.18	1.82	0.00	82.51	N/A	N/A
2441.00	65.07	PK	V	28.18	1.82	0.00	95.07	N/A	N/A
2441.00	63.54	AV	V	28.18	1.82	0.00	93.54	N/A	N/A
4882.00	47.20	PK	V	33.06	3.27	37.21	46.32	74.00	27.68
4882.00	34.18	AV	V	33.06	3.27	37.21	33.30	54.00	20.70
7323.00	45.27	PK	V	36.04	4.62	37.38	48.55	74.00	25.45
7323.00	32.50	AV	V	36.04	4.62	37.38	35.78	54.00	18.22
High Channel: 2480 MHz									
2480.00	63.27	PK	H	28.26	1.84	0.00	93.37	N/A	N/A
2480.00	52.35	AV	H	28.26	1.84	0.00	82.45	N/A	N/A
2480.00	64.63	PK	V	28.26	1.84	0.00	94.73	N/A	N/A
2480.00	53.55	AV	V	28.26	1.84	0.00	83.65	N/A	N/A
2483.50	28.62	PK	V	28.27	1.84	0.00	58.73	74.00	15.27
2483.50	13.92	AV	V	28.27	1.84	0.00	44.03	54.00	9.97
4960.00	46.84	PK	V	33.22	3.23	37.25	46.04	74.00	27.96
4960.00	34.02	AV	V	33.22	3.23	37.25	33.22	54.00	20.79
7440.00	44.52	PK	V	36.34	4.41	37.52	47.75	74.00	26.25
7440.00	32.16	AV	V	36.34	4.41	37.52	35.39	54.00	18.61

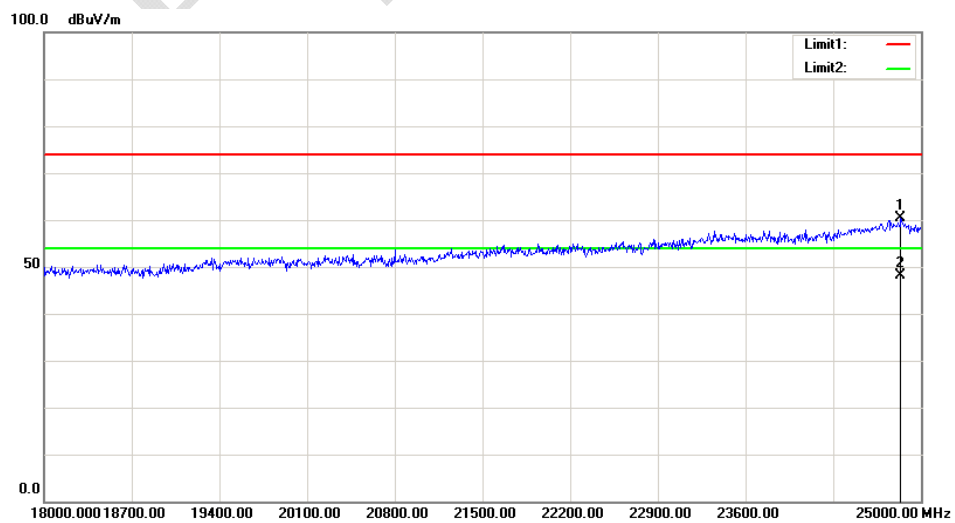
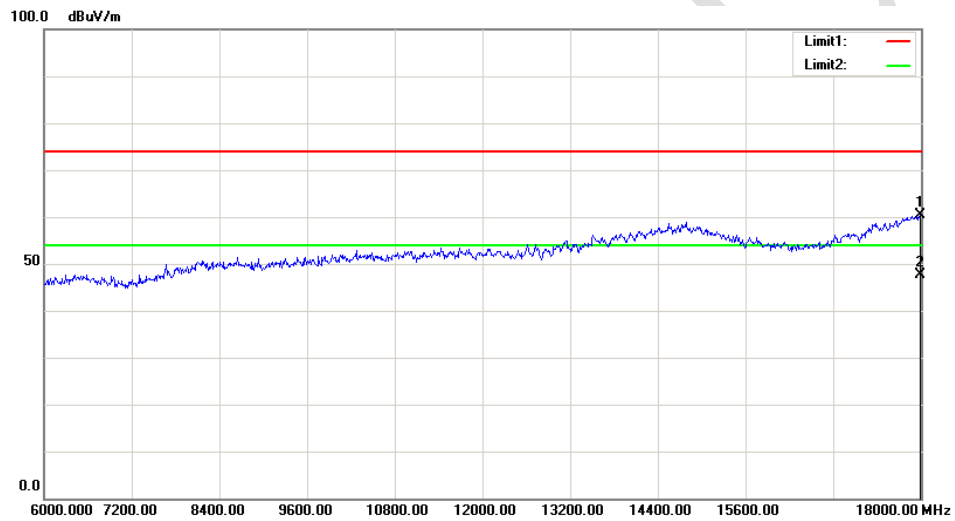
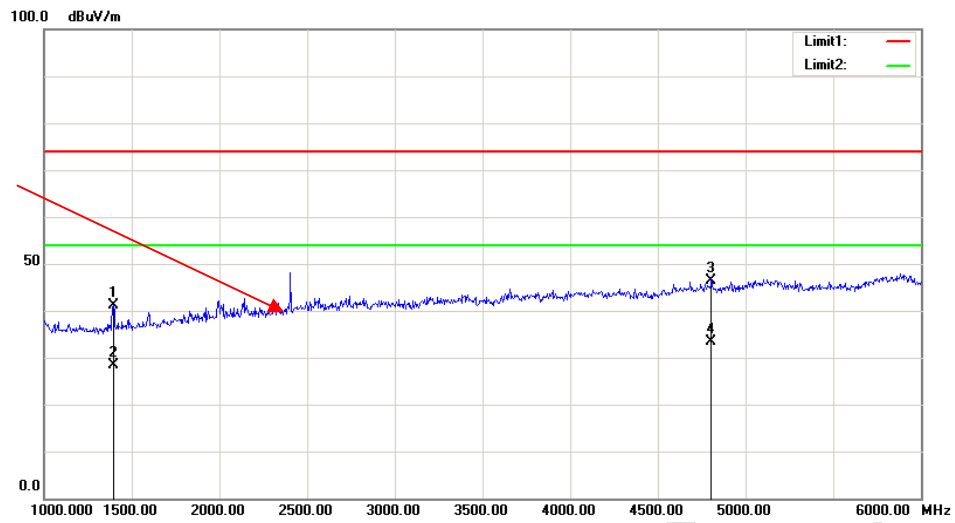
Worst plots (BDR middle channel was the worst)
Horizontal

Fundamental
Test with Band
Rejection Filter



Vertical

Fundamental
Test with Band
Rejection Filter



Simultaneous Transmitting(Bluetooth BDR middle Channel+PCS 1900 Middle channel was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
361.74	35.95	QP	H	14.63	2.40	25.85	27.13	46.00	18.87
768.17	34.56	QP	H	21.06	3.78	26.75	32.65	46.00	13.35
222.06	37.96	QP	V	10.80	1.88	25.50	25.14	46.00	20.86
446.13	35.69	QP	V	16.62	2.70	26.63	28.38	46.00	17.62
4882.00	48.25	PK	V	33.06	3.27	37.21	47.37	74.00	26.63
4882.00	35.66	AV	V	33.06	3.27	37.21	34.78	54.00	19.22
7323.00	46.95	PK	V	36.04	4.62	37.38	50.23	74.00	23.77
7323.00	33.87	AV	V	36.04	4.62	37.38	37.15	54.00	16.85
3760.00	56.25	PK	V	31.87	2.52	37.01	53.63	82.20	28.57
3760.00	54.29	PK	H	31.87	2.52	37.01	51.67	82.20	30.53

Note: 3760 MHz is the harmonics of PCS 1900 Middle channel, it is limited by -13dBm(=82.2 dBμV/m)

***** END OF REPORT *****