









Emission above 18GHz



2.4GHz BT (SHF @ 1m)



Emission below 1GHz



2.4GHz BT (LF)



Appendix E. Duty Cycle Plots

<Ant. 6>

3DH5 o	n time (One Pulse	e) Plot on Cl	nannel 78	on time (Count Pulses) Plot on Channel 39				
Spectrum Analyzer 1 Swept SA KEYSIGHT Input: RF T	+ Input Z. 50 0 (#Atten: 20 dB PNO Fast Care Off Freq Ref: Int (S)	#Awg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run W W W W W P N N N N	Marker • 🔛	Spectrum Analyzer 1 + Swept SA KEYSIGHT Input RF RL + RL + Align: Off	Z 50 Ω #Atten 20 dB PNO Fast SCorr Cate Off Ret:Int (S) IF Gain Low Sig Track Off	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run WWW WWW P N N N N	Marker Reference Marker Marker 1	
1 Spectrum Scale/Div 10 dB Log 107 770 870 870 870 870 870 870 870 870 8	Ref Level 115.99 dBy/ 01Δ2 ∳3Δ4 (narryin)4	ΔMkr3 3.750 ms 0.00 dB	3.75000 ms Cettrogs Marker Mode Psarch Normal Ps. Search Orta (A) Properties Fixed Marker Oft Detta Marker Marker-	1 Spectrum CoolerDiv 10 dB Co	Ref Level 116.92 dBpl/	Mkr1 39.70 ms 84.29 dBµV	39.7000 ms Seatog Marker Mode Search Normal Pk Search Oetla (Δ) Properties Fixed Marker Oft Marker Marker	
Center 2.45000000 0Hz Res BW 10 MHz 5 Marker Table Mode Trace Scale 1 Adz 2 F 3 Ad 4 F 5 6 6	X Y Function F (A) 2.800 ms (A) 0.4007 g8 Function F (A) 2.800 ms (A) 0.4007 g8 Function F (A) 3.700 ms 6.3.06 d8y/v F F (A) 3.700 ms 63.06 d8y/v F F (B) 5.002 f8 M F F F (B) 5.002 f8 M F </td <td>Span 0 Hr. Sweep 10.0 ms (1001 pts) Sunction Width Function Value</td> <td>Reade Data Marker Table Or Off All Marker Softings Other Output Other</td> <td>570 470 470 370 370 270 Center 2.45000000 GHz Res BW 1.0 MHz End C 2.550 Center 2.45000000 GHz Res BW 1.0 MHz</td> <td>ג'יישאין איישאין איישא איישאין איישאין איישאין איישאין איישאין איישאין איישאין איישאין איישאין</td> <td>Alo al per el anter el preferit (en el al Span 0 H. Sweep 100 ms (100 pts)</td> <td>(React Data) Marker Table Or Digram All Markers Off Couple Markers Off</td>	Span 0 Hr. Sweep 10.0 ms (1001 pts) Sunction Width Function Value	Reade Data Marker Table Or Off All Marker Softings Other Output Other	570 470 470 370 370 270 Center 2.45000000 GHz Res BW 1.0 MHz End C 2.550 Center 2.45000000 GHz Res BW 1.0 MHz	ג'יישאין איישאין איישא איישאין איישאין איישאין איישאין איישאין איישאין איישאין איישאין	Alo al per el anter el preferit (en el al Span 0 H. Sweep 100 ms (100 pts)	(React Data) Marker Table Or Digram All Markers Off Couple Markers Off	

Note:

- 1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.88 / 100 = 5.76 %
- 2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.79 dB
- 3. 3DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

2.88 ms x 20 channels = 57.6 ms

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. [100 ms / 57.6 ms] = 2 hops Thus, the maximum possible ON time:

2.88 ms x 2 = 5.76 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.76 \text{ ms}/100 \text{ ms}) = -24.79 \text{ dB}$$



<Ant. 7>

3DH5 on time (One Pulse) Plot on (Channel 78	on time (Count Pulses) Plot on Channel 39				
Non-control National 1 Image 12 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1	Marker Marker Marker Marker Marker 3 Marker A Time	Spectrum Marker 1 weard 2A ←	ker			
1 Spochum • ΔMkr3 3,3760 r Cogn • Ref Level 116.59 dByV -0.02 d 100 • • • -	S 3.75000 ms Celling B Marker Mode Search Normal Pr Search Oblat Oblat Delta (A) Properties Off Function Delta Marker Marker	I Spectrum Mkr1 11.60 ms 11.000 ms Costerior 10 08 Ref Level 116.99 dBµV 100.31 dBµV 107 100 Peak Search 100 100 Next Peak	Properties Marker Marker Marker Marker			
Center 2 48000000 GHz XVideo BW 1.0 MHz Syme 0 Sweep 10.0 ms (1001 f 3 Markor Table Syme 0 Sweep 10.0 ms (1001 f 5 Markor Table Syme 10.0 ms (1001 f 5 Markor Table Symep	Hz (Reset Datia) Marker Table Con Of Of All Markers Off Couple Markers Couple Markers Off	Center 24000000 GHz #Video BW 1.0 MHz Span 0 Hz Span 0 Hz 9 Markor Bolo • Sweep 100 ms (1001 pts) Markor Bolo 1 Morkor Bolo • • Function Function Value Markor Bolo 1 Morkor Bolo • • • • • 1 Morkor Bolo • • • • • 1 Morkor Bolo • • • • • 1 Morkor Bolo •	Counter			

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2.88 ms x 2 = 5.76 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

20 x log(5.76 ms/100 ms) = -24.79 dB



Appendix G. Spot Check Evaluation on TC58BE

Conducted power test and radiated spurious emission test configurations were selected from the worst cases identified in the reference model and tested to demonstrate the test data from reference model remains representative for the variant model.

The deviation between the spot check and the referenced values is within 3dB, therefore data referencing is justified according to the guidance in the ECR inquiry

Mode	Test Item	UZ7TC58AE Reference Worst mode Test Result	UZ7TC58BE Variant Check Test Result	Deviation	Limit (dB)
	Number of Channels	79	79	0	Within the authorized block
	Hopping Channel Separation	1.007	1.303	0.296	Within the authorized block
	Dwell Time of Each Channel	0.31	0.31	0	Within the authorized block
	20dB Bandwidth	0.872	0.87	0.002	Within the authorized frequency block
BT	99% Bandwidth	0.803	0.798	0.005	Within the authorized frequency block
	Conducted Band Edges	-43.53	-45.87	2.34	Deviation (ddB) < 3 dB
	Conducted Spurious Emission	-36.86	-38.91	2.05	Deviation (ddB) < 3 dB
	Peak Output Power	7.18	6.7	0.48	Deviation (ddB) < 3 dB
	Radiated Band Edges and Radiated Spurious Emission	48.41	47.65	0.76	Deviation (ddB) < 3 dB
	AC Conducted Emission	17.48	19.72	2.24	Deviation (ddB) < 3 dB
	6dB Bandwidth	1.142	1.155	0.013	Within the authorized frequency block
	99% Bandwidth	1.998	1.996	0.002	Within the authorized frequency block
	Power Spectral Density	5.44	6.07	0.63	Deviation (ddB) < 3 dB
BLE	Conducted Band Edges	-43.68	-46.24	2.56	Deviation (ddB) < 3 dB
	Conducted Spurious Emission	-41.5	-38.88	2.62	Deviation (ddB) < 3 dB
	Peak Output Power	6.3	5.9	0.4	Deviation (ddB) < 3 dB
	Radiated Band Edges and Spurious Emission	50.56	50.49	0.07	Deviation (ddB) < 3 dB
	AC Conducted Emission	17.48	19.72	2.24	Deviation (ddB) < 3 dB
	6dB Bandwidth	9.03	8.54	0.47	Within the authorized frequency block
	99% Bandwidth	13.59	13.52	0.07	Within the authorized frequency block
	Power Spectral Density	1.78	1.06	0.72	Deviation (ddB) < 3 dB
WIFI 2.4G	Conducted Band Edges	-30.53	-30.89	0.36	Deviation (ddB) < 3 dB
	Conducted Spurious Emission	-46.39	-48.89	2.50	Deviation (ddB) < 3 dB
	Peak Output Power	23.41	23.31	0.1	Deviation (ddB) < 3 dB
	Radiated Band Edges and Spurious Emission	59.99	59.85	0.14	Deviation (ddB) < 3 dB
	AC Conducted Emission	17.48	19.72	2.24	Deviation (ddB) < 3 dB



Mode	Test Item	UZ7TC58AE Reference Worst mode Test Result	UZ7TC58BE Variant Check Test Result	Deviation	Limit (dB)	
	26dB Bandwidth	167.75	165.22	2.53	Within the authorized frequency block	
	99% Bandwidth	154.89	155.47	0.58	Within the authorized frequency block	
WIFI 5G	Power Spectral Density	-2.9	-1.17	1.73	Deviation (ddB) < 3 dB	
	Conducted Output Power	17.81	17.71	0.1	Deviation (ddB) < 3 dB	
	Unwanted Emissions	63.2	64.81	1.61	Deviation (ddB) < 3 dB	
	AC Conducted Emission	18.52	19.96	1.44	Deviation (ddB) < 3 dB	
	26dB Emission Bandwidth	20.75	21.14	0.39	Within the authorized frequency block	
WIFI 6G UNII-8	99% Occupied Bandwidth	18.88	18.92	0.04	Within the authorized frequency block	
(802.11ax HE20 CH189	Conducted Output Power	7.66	7.56	0.1	Deviation (ddB) < 3 dB	
6895MHz)	Fundamental Maximum EIRP	9.8	9.7	0.1	Deviation (ddB) < 3 dB	
	Fundamental Power Spectral Density	-1.04	-1.41	0.37	Deviation (ddB) < 3 dB	
	In-Band Emissions	-10.04	-12.35	2.31	Deviation (ddB) < 3 dB	
WIFI 6G UNII-8 (802.11ax HE80 CH215 7025MHz)	Unwanted Emissions	72.37	72.28	0.09	Deviation (ddB) < 3 dB	
WIFI 6G	AC Conducted Emission	18.52	19.96	1.44	Deviation (ddB) < 3 dB	



List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 07, 2023	Apr. 22, 2024	Nov. 06, 2024	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	1036004	N/A	Jul. 27, 2023	Apr. 22, 2024	Jul. 26, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101466	10HZ~44GHZ	Jan. 24, 2024	Apr. 22, 2024	Jan. 23, 2025	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Feb. 08, 2024	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 06, 2023	Feb. 08, 2024	Dec. 05, 2024	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Oct. 26, 2023	Feb. 08, 2024	Oct. 25, 2024	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 22, 2023	Feb. 08, 2024	Nov. 21, 2024	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Feb. 08, 2024	N/A	Conduction (CO05-HY)
ISN Cable	MVE	RG-400	200260	N/A	Dec. 28, 2023	Feb. 08, 2024	Dec. 27, 2024	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBE CK	VTSD 9561-F N	00691	9kHz-200MHz	Jul. 28, 2023	Feb. 08, 2024	Jul. 27, 2024	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 28, 2023	Feb. 08, 2024	Dec. 27, 2024	Conduction (CO05-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	N/A	Oct. 06, 2023	Apr. 26, 2024~ Apr. 27, 2024	Oct. 05, 2024	Radiation (03CH20-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 27, 2023	Apr. 26, 2024~ Apr. 27, 2024	Jun. 26, 2024	Radiation (03CH20-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Apr. 26, 2024~ Apr. 27, 2024	N/A	Radiation (03CH20-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Apr. 26, 2024~ Apr. 27, 2024	N/A	Radiation (03CH20-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Apr. 26, 2024~ Apr. 27, 2024	N/A	Radiation (03CH20-HY)
Signal Analyzer	Keysight	N9010B	MY60240520	N/A	Dec. 12, 2023	Apr. 26, 2024~ Apr. 27, 2024	Dec. 11, 2024	Radiation (03CH20-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	02360	1GHz-18GHz	Oct. 30, 2023	Apr. 26, 2024~ Apr. 27, 2024	Oct. 29, 2024	Radiation (03CH20-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	1224	18GHz-40GHz	Jul. 10, 2023	Apr. 26, 2024~ Apr. 27, 2024	Jul. 09, 2024	Radiation (03CH20-HY)
Preamplifier	COM-POWER	PAM-103	18020201	1MHz-1000MHz	Jan. 01, 2024	Apr. 26, 2024~ Apr. 27, 2024	Dec. 31, 2024	Radiation (03CH20-HY)
Amplifier	EMCI	EMC118A45SE	980792	N/A	Nov. 13, 2023	Apr. 26, 2024~ Apr. 27, 2024	Nov. 12, 2024	Radiation (03CH20-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519229/2,804 015/2,804027 /2	N/A	Jan. 17, 2024	Apr. 26, 2024~ Apr. 27, 2024	Jan. 16, 2025	Radiation (03CH20-HY)
Hygrometer	TECPEL	DTM-303A	TP211382	N/A	Mar. 27, 2024	Apr. 26, 2024~ Apr. 27, 2024	Mar. 26, 2025	Radiation (03CH20-HY)
Software	Audix	N/A	RK-002156	N/A	N/A	Apr. 26, 2024~ Apr. 27, 2024	N/A	Radiation (03CH20-HY)

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